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(54) (Title of the Invention)
INFORMATION PROCESSOR

(57) (Abstract)
(Problem) To enable easy data processing while also enabling display of information that represents the status of each peripheral device through document display software.
(Means for Solving the Problem) The Web server 22 acquires the information to be outputted via the unit information acquirement task 24, and following the output format established in the setting information 21, it generates an HTTP message from the information to be outputted in either an HTML format or an XML format, or in both formats. Then, it transmits the noted HTTP message via the generated HTML format or the XML format, or in both formats. In the computer device, the information of the above HTML format is displayed through general browser software, and in the server device, the information of the above XML format is interpreted with the prescribed software, and performing data management of the status of the device and of the statistical information, it performs overall management.

[see source for figure]

21 Setting Information
[below 10:] Status
24 Unit Information Acquirement Task
20 Initialization Task
22 Web Server
23 ICP/IP Protocol Stack

(Scope of Patent Claims)

(Claim 1) An information processor that transmits a variety information about the unit to external devices, and wherein: there is an information acquisition means to acquire information on the unit; there is a first format to display the output status of said external device within said information; there is a second format to display the said information itself to enable data processing in said external device; and by following each of these formats, there is an information output means to output the above.

(Claim 2) An information processor as claimed in Claim 1, wherein: said information output means consists of a format selection means to select the format in which to note the information, whether in said first format, or in said second format, or through both formats; and said information output means notes and outputs the information following the format selected by said format selection means.

(Claim 3) An information processor as claimed in Claim 2, wherein: said format selection means selects the format in which to note information for each output, whether in said first format, or in said second format, or through both formats.

(Claim 4) An information processor as claimed in Claim 2, wherein: said format selection means selects said first format when transmitting information in relation to an inquiry into the unit, and it selects said second means when transmitting information of its own accord.

(Claim 5) An information processor as claimed in Claim 2, wherein: said format selection means selects the format for each item of information to be outputted in either said first format, or said second format, or through both formats.

(Claim 6) An information processor as claimed in any of Claims 1-5, wherein: said information output means has an HTML format for said first format, and has an XML format for said second format.

(Detailed Explanation of the Invention)

(0001)

(Technical Field of the Application) The present invention relates to an information processor that transmits device information, status information and statistical information of the units, which consist of various peripheral devices including a printer apparatus and complexing apparatus that can be connected to a network, via the network.

(0002)

(Prior Art) Conventionally, in various types of peripheral apparatus such as a printer devices and complexing apparatus that can be connected to a network, the information of the unit is converted to code called an MIB (Managed Information Block), and using SNMP (Simple Network Management Protocol), the information is transmitted to the computer device on the network, where the code is analyzed by said computer device, and displaying said information, this information is either saved or processed. In this type of prior art, by loading software to convert the code information in the computer device and display it in a readable character string, it is possible to display information for each peripheral device. Further, in this prior art, by saving and processing the received code information, it is possible to perform statistical management, and by accumulating and processing information from multiple peripheral devices, it is possible to manage multiple peripheral devices as a group.

(0003) Also, in recent years, along with the growth of the internet environment, most computer devices have come to include document display software that displays HTML (HyperText Markup Language). Here, by transmitting the information for each peripheral device that is connected to the above-described network through the HTML document format, it is possible to display the information for each peripheral device in the HTML browser that has been loaded onto the computer device beforehand. According to this technology, it is possible to display information without needing to load special software onto the information-receiving computer device.

(0004)

(Problem to be Solved by the Invention) However, in the prior art that uses the above-described SNMP, in order for the coded information to arrive, there needs to be special software loaded onto the computer in order to analyze the coded information on the side of the computer that receives the information in order to display it.

(0005) Also, in the prior art that uses the latter HTML, the information will become a character string that has not been coded, leading to difficulties in data processing of tabulations. In other words, while it is possible for a character string that displays a certain state to be read out and understood by a human, it is not regulated as a character string, and it is difficult for the computer to automatically process it.

(0006) The present invention has taken the above state of affairs into consideration, and aims to provide an information processor that can display the information that displays the status of the peripheral devices through general document display software that is generally included with many computer devices, as well as one that can easily perform data processing for information that displays the status of each peripheral device.

(0007)

(Means for Solving the Problem) In order to resolve the above problems, in the invention as claimed in Claim 1, there is an information processor that transmits information about the unit to external devices, and wherein: there is an information acquisition means to acquire information on the unit; there is a first format to display the output status of said external device within said information; there is a second format to display the said information itself to enable data processing in said external device; and by following each of these formats, there is an information output means to output the above.

(0008) According to the present invention, in the information processor that transmits information about the device to an external apparatus such as a computer, the unit information is acquired through an information acquisition means, and through an information output means, the information that has been acquired for the apparatus

is noted and outputted following the first format that displays the output state in said external apparatus of said information, and following the second format that displays said information itself to enable data processing within said external apparatus. Therefore, not only is it possible to display each type of information that has been noted according to said first format in the browser software that is generally included in many computers, it is also possible to perform data processing on the noted information according to said second format.

(0009) Also, in the format selection means, by selecting to note the information in either said first format or said second format, or in both formats, it is possible for the user to select the format of output, and to select the format of output for inquiries.

(0010) Further, through the format selection means, it is possible to select the format for output for each output event by selecting either said first format or said second format, or by using both formats — for instance, by selecting the format of output based on the accompanying information contained within each inquiry.

(0011) Also, through said format means, by selecting said first format when transmitting information in relation to an inquiry to the apparatus, or by selecting said second format when transmitting information automatically, it is possible to obtain a response in the first format when the user inquires into information about the status of the unit, or to obtain information through the second format when transmitting statistical information or accounting information from the device to the computer unit that is the server.

(0012) Further, in the format selection means, by selecting the format in which to note each item of information to be outputted, whether in said first format or in said second format, or through both formats, it is possible to output the items required for display in said first format, and to output the items requires for statistical or accounting processing in said second format.

(0013) Further, setting said first format as HTML and said second format as XML, the HTML part of the first format can be displayed in browser software that is generally loaded into computer devices, and the XML part of the second format can undergo data processing in software that is capable of processing XML.

(0014)
(Examples of Embodiment of the Present Invention) Next, we will explain the examples of embodiment of the present invention, while referring to the figures.
A-1. Structure of the First Example of Embodiment
Below, we will explain the first example of embodiment of the present invention. Figure 1 is a block diagram showing the printer structure according to the first example of embodiment of the present invention. In this figure, CPU1 executes the software that is stored within the ROM2, and controls each part of the device. ROM2 stores information that does not change, such as the printer model name, in addition to the above software program. RAM3 is used as the domain for temporary saving of operational data when executing the software through CPU1.

(0015) The nonvolatile RAM4 stores information that needs to be maintained even when the power is not connected, such as setting information. The LAN (Local Area Network) Interface 5 transmits data to the LAN through said software, and receives data from the LAN. The operation panel 6 is where the user can input the setting information according to the operation of said software. The print engine 7 receives the image data transmitted in a prescribed timing following the operation of said software as generated on RAM3 according to the operation of said software, and forms an image on the paper.

(0016) Figure 2 is a summary diagram showing the operational environment of the printer of the first example of embodiment of the present invention. In the figure, 10 is the above-described printer, and corresponding to an inquiry from the computer device 11, an HTTP (HyperText Transfer Protocol) message is generated wherein the information to be outputted is noted in the HTML format, and while this is transmitted via the LAN13, an HTTP message is generated wherein the information to be outputted is noted in the XML (eXtensible Markup Language), and this is generated via the LAN13. HTML is a language used to define the display format (the display position of text documents, the font size, the font color, and the display position of the image data), and it can note the output status within the external device such as the computer (the display status, the print status). With HTML, by noting the above information according to the pre-set tags, it is possible to display it through a general Web browser that is loaded into the external device such as a computer.

(0017) XML is a language to facilitate the automation of data processing, in other words, to facilitate the transfer of the noted information to the software that will perform the data processing. With XML, by defining the tags, it is possible to note what kind of data the noted information is within said tags, and the application that performs data processing in the computer can analyze the noted information, to perform calculation processing or database processing. Examples of the above noted information are device status information of the peripheral devices such as the printer 10 (idle status, out of paper, paper jam, output number, etc).

(0018)

Next, the computer device 11 performs an inquiry into the status of the printer 10 via the LAN 13. Here, the computer device 11 contains a Web browser, and transmitting a request to the Web server that is loaded into the printer 10 using HTTP, it receives information in the HTML form as transmitted from the printer 10 regarding said request, which is then displayed in the Web browser. Also, the server apparatus 12 performs an inquiry into the status of the printer 10 via the LAN 13, in the same manner as the computer device 11. However, here, the server apparatus 12 receives information in the XML format that has been transmitted from the printer 10 regarding said inquiry,

and after analyzing this information, it loads the data processing software (business application software, device management application software).

(0019) Also, the computer device 11 and the server 12 can receives information transmitted automatically, other than just that which has been requested, by the printer 10 by maintaining the connection for communication with the printer 10 (in either the HTML format or the XML format). In the structure in Figure 2, the computer device 11 receives and displays the HTML information, and the server 12 receives the XML information and performs data processing, but the structure is not limited to this example, and it is also acceptable to have a structure within a single computer device (or server apparatus) wherein, in addition to displaying the HTML information, data processing of the XML information is performed.

(0020) A-1. Operation of the First Example of Embodiment

Next, Figure 3 is a block diagram of the basic function of the first example of embodiment of the present invention. Also, Figure 4 is a flowchart to explain the operation when inputting power into the printer 10 according to the first example of embodiment. Below, we will explain this while referring to the flowchart shown in Figure 4. First, when the printer 10 is plugged in, the initialization task 20 shown in Figure 3 is begun (step Sa1). Next, the initialization task 20 will acquire format information relating to the format when transmitting information about printer 10 from the setting information 21 (step Sa2). In other words, it will acquire information noted either according to the HTML format, the XML format, or in both formats. Then, the acquired information will be set up as the operation parameters of the Web server 22 (step Sa3).

(0021) Next, Figure 5 is a flowchart to explain the operation during normal running of the printer in the first example of embodiment. Below, we will explain this while referring to the flowchart. First, the Web server 22 will wait for notification via the unit information acquisition task 24 of the information from the printer engine 7 while it also waits to receive an inquiry from the LAN interface via the TCP/IP protocol stack 23 in an HTTP command (step Sb1). Here, the information can include "out of paper," etc.

(0022) Then, when the inquiry or the information has been generated, the Web server 22 will acquire the information required to communicate the information or to respond to the inquiry via the unit information acquisition task 24 (step Sb2). Next, the Web server 22 will determine whether the HTML format has been set as the output format or not (step Sb3). Then, when the HTML format has been set, it will generate an HTTP message in the HTML format from the acquired information (step Sb4).

(0023) Next, the Web server 22 will determine whether the XML format has been set as the output format or not (step Sb5). Then, when the HTML format has been set, it will generate an HTTP message in the XML format from the acquired information (step Sb6). Next, the Web server 22 will transmit the HTTP message noted in either the generated HTML format or the XML format, or in both formats (step Sb7).

(0024) Here, Figure 6 is an explanatory diagram of an example of the transmitted HTTP message. Figure 7 is an explanatory diagram of an example of the document data contained within the HTTP message, in other words, of the document data noted in either the HTML format or in the XML format. As shown in Figure 6, the HTTP message is formed of a header part 30 and a document data 31. Also, the document data 31 is, as shown in Figure 7, formed of an HTML part 33 that was noted in the HTML format and an XML part 33 that was noted in the XML format. However, in actuality, as explained in Figure 5, there are cases wherein the document data is transmitted in either the HTML format or in the XML format.

(0025) In the above-described first example of embodiment, according to the flowchart shown in Figure 4, in the initialization task 20, the output format acquired form the setting information 21 when plugging in the device is set up by the Web server 22, but it is also acceptable to set the output format in the Web server 22 when performing set up through the operation panel 6. Or, it is also acceptable for the Web server 22 to determine the output format by referring to the setting information 21.

(0026) B-1. Structure of the Second Example of Embodiment

Next, we will explain about the second example of embodiment. Figure 8 is a block diagram showing the software configuration of the printer in the second example of embodiment of the present invention. Those parts that correspond to Figure 3 have been noted with the same symbols, and we will omit their explanation. In the second example of embodiment, the points that differ from the first example of embodiment are where we have removed the initialization task 20, and where we have added a new command analysis function 25. The command analysis function 25 analyzes the inquiry HTTP command in order to determine whether the inquiry in the HTTP command is demanding information in the HTML format or in the XML format.

(0027) B-2 Operation of the Second Example of Embodiment

Next, we will explain the operation of the second example of embodiment. Here, Figure 9 is a flowchart to explain the operation of the printer of the second example of embodiment. First, the Web server 22 will simultaneously wait to receive an HTTP command inquiry and to receive a communication about a variety of information from the printer engine 7 (step Sc1). Below, for the operation when communicating this information, as proceeding from steps Sc4–Sc9, the format is the same as in the first example of embodiment, so we will omit that explanation here.
(0028) The Web server 22 will analyze the inquiry HTTP command using the command analysis function 25 when there has been an inquiry (YES at step Sc2), and will determine whether the HTML format has been requested, or whether the XML format has been requested (step Sc3).

Here, Figure 10 is an explanatory diagram showing an example of the transmitted HTTP command message. In this figure, (Document-Format:) displays the form of the document that has been demanded. In the example in this figure, we have noted (HTML), so it is clear that the HTML format has been requested. Next, the Web server 22 will acquire the information required to communicate the information or to respond to the inquiry via the unit information acquisition task 24 (step Sc4).

(0029) Next, the Web server 22 will determine whether the HTML format has been requested or not, based on the results of the above analysis (step Sc5). Then, when the HTML format has been requested, it will generate an HTTP message in the HTML format based on the acquired information (step Sc6). Next, the Web server 22 will determine whether the XML format has been requested or not, based on the results of the above analysis (step Sc7). Then, when the XML format has been requested, it will generate an HTTP message in the XML format based on the acquired information (step Sc8). Next, the Web server 22 will transmit the HTTP message that was generated in either the HTML format or in the XML format (step Sc9).

(0030) C-1. Structure of the Third Example of Embodiment

Next, we will explain about the third example of embodiment. Figure 11 is a block diagram that shows the software configuration of the third example of embodiment of the present invention. For those areas that correspond to either Figure 3 or Figure 8, we will use the same symbols, and we will omit their explanation here. In the figure, the format determination function 26 determines whether it is a response to an inquiry or a communication of information. The Web server 22 will, according to the determination results of said format determination function 26, generate an HTTP message in the HTML format from the acquired information when it is a response to an inquiry, and will generate an HTTP message in the XML format from the acquired information when it is a communication of information.

(0031) C-3 Operation of the Third Example of Embodiment

Next, we will explain the operation of the third example of embodiment. Here, Figure 12 is a flowchart to explain the operation of the printer according to the third example of embodiment of the present invention. First, the Web server 22 will simultaneously wait to receive an inquiry through the HTTP command, and to receive a communication on information from the printer engine 7 (step Sd1). Next, the Web server 22 will acquire the information required in order to respond to the inquiry or to communicate the information via the unit information acquisition task 24 (step Sd2). Next, the Web server 22 will determine whether it is a response to an inquiry or not, based on the format determination function 26 (step Sd3). Then, when it is a response to an inquiry, it will generate an HTTP message in the HTML format from the acquired information (step Sd4).

(0032) Next, the Web server 22 will determine whether it is a communication of information or not, based on the format determination function 26 (step Sd5). Then, when it is a communication of information, it will generate an HTTP message in the XML format from the acquired information (step Sd6). Next, the Web server 22 will transmit the HTTP message that has been generated in either the HTML format or in the XML format (step Sd7).

(0033) D-1 Structure of the Fourth Example of Embodiment

Next, we will explain about the fourth example of embodiment. Figure 13 is a block diagram that shows the software configuration of the fourth example of embodiment of the present invention. For those areas that correspond to items in Figure 3, Figure 8 or Figure 11, we will use the same symbols, and we will omit their explanation here. In the figure, the format definition 27 is a table that records information that displays output in the HTML format or in the XML format for each item of information to be outputted. Said format definition 27 is referred to by the format determination function 26.

(0034) Here, Figure 14 is an explanatory diagram showing an example of the format definition 27 according to the fourth example of embodiment. In the figure, row 101 shows the items of information. In the row shown in the figure, (printer state), (administrator message) and (total pages printed) are the information that has been set up. Next, row 102 shows whether said items are outputted in the HTML format or not. Also, row 103 shows whether said items are outputted in the XML format or not. In the row shown in the figure, (printer status) is set up such that it will be outputted in both the HTML format and in the XML format, (administrator message) is set up such that it will be outputted in the HTML format, and (total pages printed) is set up such that it will be outputted in the XML format.

(0035) Operation of the Fourth Example of Embodiment

Next, we will explain the operation of the fourth example of embodiment. Here, Figure 15 is a flowchart to explain the operation of the printer according to the fourth example of embodiment of the present invention. First, the Web server 22 will simultaneously wait to receive an inquiry through the HTTP command, and to receive a communication on information from the printer engine 7 (step Se1). Next, the Web server 22 will acquire a single

piece of information required in order to respond to the inquiry or to communicate the information via the unit information acquisition task 24 (step Se2).

(0036) Next, the Web server 22 will refer to the format definition 27 via the format determination function 26, and will acquire the output format for said item (step Se3). Next, the Web server 22 will determine whether the output format of said item is set in the HTML format (step Se4). Then, when it has been set in the HTML format, it will generate an HTTP message in the HTML format from the acquired information (step Se5). Next, the Web server 22 will determine whether the output format of said item is set in the XML format (step Se6). Then, when it has been set in the XML format, it will generate an HTTP message in the XML format from the acquired information (step Se7).

(0037) Next, it will determine whether all of the items have been generated in the HTML format and/or in the XML format (step Se8),

and when there are still items remaining, it will return to step Se2, and once again execute the above processing. When all of the items have been generated in the HTML format and/or the XML format, the Web server 22 will transmit the HTTP message that has been generated in the HTML format and/or the XML format for all of the items (step Se9).

(0038)

(Effect of the Invention) As described above, according to the present invention, as we have made it possible to note and output various information of the device according to the first format that displays the output information in said external device of said information and in the second format that displays said information to enable data processing in said external device, it is possible to display each kind of information for the device that has been noted according to said first format in browser software that is generally contained within many computers, and at the same time, it is possible to perform data processing on the information noted according to the second format.

(0039) Also, by enabling selection of either said first format or said second format, or of both formats, it is possible to control the amount of information transmitted through control of these formats, making it possible to control the load of the processing on the receiving computer device.

(Brief Explanation of the Figures)

(Figure 1) This is a block diagram showing the structure of the first example of embodiment of the present invention.

(Figure 2) This is an explanatory diagram showing the operation environment of the first example of embodiment of the present invention.

(Figure 3) This is a block diagram showing the software configuration of the first example of embodiment of the present invention.

(Figure 4) This is a flowchart to explain the operation during initialization of the first example of embodiment of the present invention.

(Figure 5) This is a flowchart to explain the operation during normal operation of the first example of embodiment of the present invention.

(Figure 6) This is an explanatory diagram showing an example of the HTTP response of the first example of embodiment of the present invention.

(Figure 7) This is an explanatory diagram showing an example of the document data contained within the HTTP response of the first example of embodiment of the present invention.

(Figure 8) This is a block diagram showing the software configuration of the second example of embodiment of the present invention.

(Figure 9) This is a flowchart to explain the operation of the second example of embodiment of the present invention.

(Figure 10) This is an explanatory diagram showing an example of the HTTP command of the second example of embodiment of the present invention.

(Figure 11) This is a block diagram showing the software configuration of the third example of embodiment of the present invention.

(Figure 12) This is a flowchart to explain the operation of the third example of embodiment of the present invention.

(Figure 13) This is a block diagram showing the software configuration of the fourth example of embodiment of the present invention.

(Figure 14) This is an explanatory diagram showing an example of the format definition in the fourth example of embodiment of the present invention.

(Figure 15) This is a flowchart to explain the operation of the fourth example of embodiment of the present invention.

(Explanation of the Symbols)

10 printer apparatus

11 computer device

12 server device

13 LAN

20 initialization task

21 setting information

22 Web server (information output means)

23 TCP/IP protocol stack

24 unit information acquisition task (information acquisition means)

25 command analysis function (format selection means)

26 format determination function (format selection means)

27 format definition (format selection means)
32 HTML part (first format)
33 XML part (second format)
101 Item row
102 HTML format set-up row
103 XML format selection set-up row

[see source for English and figures]

(Figure 1)

4 Nonvolatile RAM
5 LAN Interface
6 Operation Panel
7 Print Engine

(Figure 2)

(Figure 4)

Start
Initialization task begin
Setting information acquisition
Output format set-up
End

[see source for English and figures]

(Figure 3)

21 Setting Information
[below 10:] Status
24 Unit Information Acquirement Task
20 Initialization Task
22 Web Server
23 ICP/IP Protocol Stack

(Figure 5)

Start
Wait for inquiry/information
Acquire all information
HTML?

HTML generation
XML?

XML generation
Communication

(Figure 12)

Start
Wait for inquiry/information
Acquire all information
Inquiry?

HTML generation
Information?

XML generation
Communication

(Figure 6)

Document data here

(Figure 7)

(Figure 10)

(Figure 14)

[see source for English and figures]

(Figure 8)

21 Setting Information
[below 10:] Status
24 Unit Information Acquirement Task
25 Command Analysis Function
22 Web Server
23 ICP/IP Protocol Stack

(Figure 9)

Start
Wait for inquiry/information
Inquiry?

Command analysis
Acquire all information
HTML?

HTML generation
XML?

XML generation
Communication

(Figure 15)
Start
Wait for inquiry/information
Acquire item information
Format determination
HTML?

HTML generation
XML?

XML generation
All items
Communication

(Figure 11)

21 Setting Information
[below 10:] Status
24 Unit Information Acquirement Task
26 Format Determination Function
22 Web Server
23 ICP/IP Protocol Stack

(Figure 13)

21 Setting Information
[below 10:] Status
24 Unit Information Acquirement Task
27 Format Definition
26 Format Determination Function
22 Web Server
23 ICP/IP Protocol Stack

[see source for English and figure]

21 Setting Information
[below 10:] Status
24 Unit Information Acquirement Task
20 Initialization Task
22 Web Server
23 ICP/IP Protocol Stack